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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,206	09/26/2003	Santosh Kumar Gangwal	234418US	4488

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EXAMINER

HERTZOG, ARDITH E

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/670,206

Applicant(s)

GANGWAL ET AL.

Examiner

Ardith E. Hertzog

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 Sept 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☒ Claim(s) 20-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This application is in response to applicant's "Utility Patent Application Transmittal Papers", filed September 26, 2003. Claims 1-40 are pending.

Abstract

2. Applicant is reminded of the proper language and format for an abstract of the disclosure:

The language should be clear and concise and should not repeat information given in the title. **It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.** (MPEP § 608.01(b))

3. The abstract of the disclosure is objected to, because, per the bolded citation above, it begins with "The disclosure relates to". Appropriate correction is required.

Specification

4. The specification is objected to under 37 CFR § 1.77(b), because it includes a "BRIEF DESCRIPTION OF DRAWINGS" section (per 37 CFR § 1.77(b)(7)) (see p. 10) and **also** repeatedly refers to such drawing at pages 16-17, **however, no drawings have been received in this application** (note that no drawings are mentioned in the aforementioned "Utility Patent Application Transmittal" papers). Appropriate correction is required.
5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR § 1.75(d)(1) and MPEP § 608.01(o). Proper

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antecedent basis has not been found in the specification for the "at least about 95 wt%" lower limit recited in claim 27. Clarification and/or appropriate correction is required.

Claim Objections

6. Claims 20-27 are objected to, because of the following minor informalities:

Independent claim 20 fails to complete the process recited in the preamble, i.e., "[t]he process for preparing a fluidizable, attrition resistant, active zinc oxide containing sorbent". That is, the last step recited in claim 20 fails to mention formation of said "fluidizable, attrition resistant, active zinc oxide containing sorbent", instead merely reciting formation of "a two phase component consisting essentially of a zinc oxide phase and a zinc aluminate phase". It is therefore suggested that the last step of claim 20 be revised as follows:

...converting said zinc oxide precursor and said aluminum oxide precursor in said spray dried particles to provide fluidizable, attrition resistant, active zinc oxide containing sorbent particles comprising a two phase component consisting essentially of a zinc oxide phase and a zinc aluminate phase. (or some similar language of applicant's choosing)

Note that claims 21-27 have been included in this rejection (even though claims 24-27 do positively recite the formation of applicant's "fluidizable, attrition resistant, active zinc oxide containing sorbent particles"), given their ultimate dependence upon claim 20. Appropriate correction is required.

Claim Rejections - 35 U.S.C. § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. § 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-19 and 28-40 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. It is respectfully submitted that these claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention for the following reasons: The specification consistently uses the term "spheroidal" in describing the shape of applicant's sorbent particles (see p. 8, line 10; p. 14, line 20), whereas claims 1-19 and 28-40 consistently use the term "spherical" (i.e., as recited in each of independent claims 1, 10 and 28, upon which claims 2-9, 11-19, and 29-40, respectively, ultimately depend). **However**, "spheroidal" and "spherical" are apparently **not** synonyms, with "spheroid" meaning: "[a] body that is shaped like a sphere but is not perfectly round, especially an ellipsoid that is generated by revolving an ellipse around one of its axes"; "spheroidal" itself meaning "in the form of an ellipse" (and considered synonymous with "ellipsoidal"); and "spherical" meaning: "[h]aving the shape of a sphere; globular[; or] [h]aving a shape approximating that of a sphere" (see enclosed Dictionary.com definitions). **Moreover**, applicant's specification appears to teach that the **shape** of the inventive sorbent particles is **critical**, by stating that prior art sorbent materials are "not available in a physical form of a size, **shape**, and density, suitable for fluidization (see p. 5, lines 11-19, especially lines 18-19, emphasis added) **and** that the inventive "sorbent compositions... can readily be produced... in a suitable physical **form**

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and size, allowing their use across a temperature range... in fluidized-bed... reactors” (see p. 5, lines 24-28, emphasis added). **In addition**, applicant’s specification states that the prior art sorbent materials of Siriwardane (US 5,494,880, US 5,703,003, and US 5,866,503) “were typically prepared in the form of 3-4 mm **ellipsoidal** pellets, and attempts to produce these sorbent materials for use in fluidized-bed reactors have not resulted in any material having sufficient attrition resistance to allow use in fluidized bed reactors” (see p. 4, lines 23-30, especially lines 27-30, emphasis added). It is again noted that the term “spheroidal” is considered **synonymous** with **ellipsoidal**, based upon the above-cited Dictionary.com definitions. **Accordingly**, it is respectfully concluded that claims 1-19 and 28-40—again, drawn to “substantially spherical” sorbent particles and their use—contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention, because, as just discussed, the specification appears to contain **conflicting** disclosure regarding the shape of the inventive sorbent particles, in, again, consistently describing them as “substantially spheroidal” (or substantially ellipsoidal), while **also** teaching that the ellipsoidal sorbent particles of the prior art have not been found effective. Appropriate correction is required.

9. Claims 20-27 are rejected under 35 U.S.C. § 112, first paragraph, as based on a disclosure which is not enabling. That “[e]ach of the two phases [of applicant’s sorbents] is characterized by a relatively small crystallite size” (see abstract) is evidently critical or essential to the practice of the invention but not included in these claims.

Accordingly, it is respectfully submitted that claims 20-27, which do **not** require this evidently critical/essential limitation, are not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Again, applicant's specification appears to teach that the zinc oxide phase and zinc aluminate phase present in the two phase active zinc component of applicant's sorbents **must** be "characterized by a relatively small crystallite size... , as determined by x-ray diffraction analysis" (see p. 6, first full paragraph, especially lines 9-13; see also the discussion at pp. 7-8, insofar as it relates to "[t]he unusually small crystallite sizes of the zinc oxide and zinc aluminate phases" (see p. 7, lines 9-10)). Note that incorporating such limitation into independent claim 20 (upon which claims 21-27 ultimately depend) would be one means of overcoming this rejection. Appropriate correction is required.

10. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 1-19 and 28-40 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. **In addition or, in the alternative**, these claims are considered vague, indefinite, and/or confusing, because, as just discussed, they consistently use the term "spherical" (i.e., as recited in each of independent claims 1, 10 and 28, upon which claims 2-9, 11-19, and 29-40, respectively, ultimately depend), whereas the specification consistently uses the term "spheroidal" in describing the shape of applicant's sorbent particles (see p. 8, line 10; p. 14, line 20). **However**, given that the terms "spherical" and "spheroidal" are apparently

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not synonyms, as **also** just discussed, it is respectfully submitted that one of ordinary skill would not be reasonably apprised of the scope of these claims. That is, do applicant's sorbent particles, as recited in claims 1-19 and 28-40, **require** a "substantially spherical" shape **or** a "substantially spheroidal" (i.e., at least somewhat ellipsoidal) shape? Appropriate correction is required.

Allowable Subject Matter

12. Claims 1-19 and 28-40 would be allowable **if rewritten or amended to overcome all rejections under 35 U.S.C. § 112 set forth in paragraphs 8. and 11 . above.**

13. Claims 20-27 would be allowable **if rewritten or amended to overcome the objection set forth in paragraph 6. above, as well as the 35 U.S.C. § 112 rejection set forth in paragraph 9. above.**

14. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to teach or to have suggested "fluidizable, attrition resistant sorbent[s]" as would be recited in such rewritten/amended independent claims 1 and 10, **as well as** processes for preparing same and using same, as would be recited in such rewritten/amended independent claims 20 and 28. In particular, the closest prior art of record is considered to be US 5,703,003 and US 5,866,503 to Siriwardane (each patent with continuation-in-part (CIP) priority to US 5,494,880). Both CIP patents teach durable regenerable sorbent pellets for removal of hydrogen sulfide from coal gas, based on zinc oxide (see abstracts of both). Both **further** teach that the

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pellets may comprise a “first inert material”, which may be, among several other ingredients, zinc aluminate, as well as a “second inert material”, which may be, among several other ingredients, zinc aluminate (see ‘003: col. 2, lines 51, and col. 3, lines 13-16; ‘503: col. 2, lines 49-53, and col. 3, lines 10-17). **However**, there is **no** teaching nor suggestion in either of these Siriwardane patents (nor in the remaining prior art of record) that, when having selected zinc aluminate for use as the first and/or second “inert material” in the disclosed zinc oxide-based sorbent pellets, of having formulated same as **two distinct phases** of zinc oxide and zinc aluminate, with the corresponding **specific** “relatively small” crystallite sizes, **as well as** the **specific** relative proportions of **total zinc oxide content** (based on the combined zinc oxide of the zinc oxide and zinc aluminate phases, in claims 1, 10, 28 and their corresponding dependent claims; based on the zinc oxide precursor and aluminum oxide precursor, in claims 20-27), as would be recited in **all** such rewritten/amended independent claims. **Accordingly**, applicant’s claims 1-40 are deemed allowable over the prior art of record.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These references are considered cumulative to or less material than those discussed above. US 6,743,405 B1 (Siriwardane) contains disclosure somewhat similar to the two Siriwardane patents discussed in detail above (see ‘405: claims 1 and 7), as does US 5,972,835 (Gupta) (see Gupta ‘835 abstract; col. 4, lines 37-40; col. 5, lines 1-16, especially lines 11-12); the Khare patents (US 5,710,091 and

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US 6,479,429 B1) have been cited for similar reasons (see abstract and claims of both). Sughrue et al. (US 6,656,877 B2) teach attrition resistant sorbent compositions comprising, among other ingredients, zinc oxide and alumina with a promoter metal, such as nickel, nickel oxide or a nickel oxide precursor (see Sughrue et al. abstract); note that the Malandra et al. US Patent Application Publication (USPGPUB) is a division of Sughrue et al. The additional USPGPUB's have been cited for their disclosure of various desulfurization sorbents which may generally contain zinc oxide, and/or zinc aluminate and/or alumina with a promoter metal (i.e., "metal promoter-zinc aluminate"), with the exception of that to Vierheilig et al., which appears related to WO 99/42201 (discussed in applicant's specification). Courty et al. (US 4,088,736), Gupta et al. (US 5,254,516 and US 5,714,331), as well as Campbell et al. (US 5,447,702), are also discussed in applicant's specification (see pp. 4, 5 and 16).

16. Any inquiry concerning this communication should be directed to Ardith E. Hertzog at telephone number (571) 272-1347. The examiner can normally be reached on Monday through Friday (from about 7:30 a.m. - 3:30 p.m.).

17. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman, can be reached at (571) 272-1358. The fax phone number for the organization where this application is assigned is 703-872-9306.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. For any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



AEH

September 3, 2004



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